



Ancient Mars Meteorite Crystals Reveals Hot Water Evidence

Description

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Scientists studying crystals inside a Martian meteorite called Black Beauty believe that Mars had abundant hot water around 4.45 billion years ago when the rock formed. Black Beauty, found in the Sahara desert after being ejected from Mars by an impact, contains valuable insights about the planet.

Researchers, like Aaron Cavosie from Curtin University, have been examining a small part of Black Beauty that contains a zircon crystal. This crystal, only 50 micrometres in size, reveals important details about Mars' geological history.

Black Beauty is a unique rock made up of various fragments that give a glimpse into both ancient and recent Martian rocks. The zircon crystal in the meteorite shows layers of iron, aluminum, and sodium, highlighting past hydrothermal activity on Mars.

The zircon in Black Beauty has survived multiple impacts, maintaining its crystal structure over billions of years. This indicates the presence of water under the Martian surface long ago, possibly influencing the planet's early environment.

Research by Eva Scheller from Stanford University suggests that the formation of Black Beauty offers crucial insights into Mars' early water behavior, hinting at the possibility of ancient water vapor in Mars' atmosphere.

Studying Martian meteorites like Black Beauty helps scientists understand the planet's history and potential for past life. This research expands our knowledge of Mars' geological evolution and early environmental conditions.

Topics: Martian Meteorite, Black Beauty, Mars' History, Zircon Crystal, Hydrothermal Activity

Vocabulary List:

1. **Meteorite** /'mi:tə.ə.raɪt/ (noun): A solid fragment of a meteoroid that survives its passage through the atmosphere and lands on the surface of a planet.
2. **Hydrothermal** /,haɪ.drəθ'θɜ:.məɪ/ (adjective): Relating to or denoting the action of heated water especially in geological contexts.
3. **Geological** /,dʒi:.ə'lɒdʒ.ɪ.kəl/ (adjective): Relating to the study of the solid Earth its rocks and the processes by which they change.
4. **Insights** /'ɪn.saɪts/ (noun): An accurate and deep understanding of a complex situation or problem.
5. **Fragment** /'fræɡ.mənt/ (noun): A small part broken or separated off from something.
6. **Abundant** /ə'bʌndənt/ (adjective): Existing or occurring in large amounts; plentiful.

Comprehension Questions



Multiple Choice

1. Where was the Martian meteorite Black Beauty found?
 - Option: Sahara desert
 - Option: Amazon rainforest
 - Option: Antarctica
 - Option: Gobi desert
2. What valuable insights about Mars does Black Beauty contain?
 - Option: Historical weather patterns
 - Option: Geological history
 - Option: Ancient civilizations
 - Option: Extraterrestrial life forms
3. Which university is Aaron Cavosie from?
 - Option: Stanford University
 - Option: Curtin University
 - Option: Harvard University
 - Option: Oxford University
4. What elements are highlighted by the zircon crystal in Black Beauty?
 - Option: Gold and silver
 - Option: Iron, aluminum, and sodium
 - Option: Diamond and graphite
 - Option: Platinum and palladium
5. What does the survival of the zircon crystal in Black Beauty over billions of years indicate?
 - Option: Ancient civilizations on Mars
 - Option: Presence of water under the Martian surface
 - Option: Extreme temperatures on Mars
 - Option: Alien technology influence
6. According to Eva Scheller from Stanford University, what crucial insights does the formation of Black Beauty offer?
 - Option: Insights into Martian vegetation
 - Option: Clues about alien invasions
 - Option: Details about Mars' early water behavior
 - Option: Predictions about future Martian missions



True-False

7. Black Beauty was ejected from Mars by an impact.
8. The zircon crystal in Black Beauty is over 100 micrometres in size.
9. Black Beauty shows layers of gold, platinum, and palladium.
10. The research on Black Beauty only focuses on recent Martian rocks.
11. Eva Scheller is a researcher from Harvard University.
12. Studying Martian meteorites like Black Beauty has no impact on our understanding of Mars' geological evolution.

Gap-Fill

13. The zircon crystal in Black Beauty is only _____ in size.
14. Black Beauty is made up of various fragments that give insights into both _____
and recent Martian rocks.
15. Black Beauty indicates the presence of water under the Martian surface long ago, possibly influencing the planet's early _____.
16. Research by Eva Scheller from _____ University suggests crucial insights into Mars' early water behavior.
17. Studying Martian meteorites like Black Beauty helps scientists understand the planet's history and potential for past _____.
18. The zircon in Black Beauty has survived multiple impacts, maintaining its crystal structure over billions of _____.



Answer

Multiple Choice: 1. Sahara desert 2. Geological history 3. Curtin University 4. Iron, aluminum, and sodium
5. Presence of water under the Martian surface 6. Details about Mars' early water behavior

True-False: 7. True 8. False 9. False 10. False 11. False 12. False

Gap-Fill: 13. 50 micrometres 14. ancient 15. environment 16. Stanford 17. life 18. years

Vocabulary quizzes

Multiple Choice (Select the Correct answer for each question.)

1. What small rocky object orbits the sun?

- Option: Meteorite
- Option: Asteroid
- Option: Fireball
- Option: Fragment

2. What is the result of an object hitting another object with great force?

- Option: Collaboration
- Option: Impact
- Option: Settlement
- Option: Insights

3. What term relates to the application of scientific knowledge for practical purposes?

- Option: Fluorescent
- Option: Technological
- Option: Meteorite
- Option: Marangoni

4. What term describes something causing great harm or damage?

- Option: Evoke
- Option: Destructive
- Option: Secreting
- Option: Revolutionize

5. What term relates to hot water rising from the Earth's interior?



- Option: Tensions
- Option: Hydrothermal
- Option: Marangoni
- Option: Fragment

6. What describes something that is at a higher level than others?

- Option: Forecasted
- Option: Advanced
- Option: Spectacle
- Option: Propelling

7. What involves two or more people working together towards a shared goal?

- Option: Claims
- Option: Enhance
- Option: Collaboration
- Option: Interpret

8. What term means being the only one of its kind?

- Option: Unique
- Option: Abundant
- Option: Deceptively
- Option: Insights

9. What term describes something made or produced by human beings rather than occurring naturally?

- Option: Propelling
- Option: Artificial
- Option: Tensions
- Option: Fragment

10. What term means producing and discharging a substance such as a hormone from a cell or gland?

- Option: Revolutionize
- Option: Secreting
- Option: Marangoni
- Option: Tensions

Gap-Fill (Fill in the blanks with the correct word from the vocabulary list.)

11. A _____ is a very bright meteor that may be seen even in daylight.

12. The weatherman _____ heavy rain for tomorrow.



13. The movie's soundtrack managed to _____ strong emotions in the audience.
14. The _____ effect is the mass transfer along an interface between two fluids due to surface tension gradient.
15. The engine works by _____ the vehicle forward.
16. The new technology aims to _____ the way we communicate with each other.
17. The agreement resulted in a _____ between the two parties.
18. The political debate led to increased _____ among the members of the council.
19. The research study provided valuable _____ into the behavior of the target demographic.
20. The explosion caused the rock to _____ into smaller pieces.

Matching Sentences (Match each definition to the correct word from the vocabulary list.)

21. New technologies and scientific discoveries contribute to societal progress.
22. The study of rocks minerals and Earth's structure falls under this branch of science.
23. Resources that are plentiful and widely available.
24. The process of systematically examining a matter to uncover facts and details.
25. Statements made by individuals asserting that something is true.
26. Emitting light as a result of absorption of radiation from another source.
27. Having an appearance that misleads or gives a false impression.
28. A solid piece of debris from an object such as a comet or asteroid that survives its passage through the Earth's atmosphere.
29. To improve the quality value or attractiveness of something.



30. An event or scene that is visually striking or impressive.

Answer

Multiple Choice: 1. Asteroid 2. Impact 3. Technological 4. Destructive 5. Hydrothermal 6. Advanced
7. Collaboration 8. Unique 9. Artificial 10. Secreting

Gap-Fill: 11. Fireball 12. forecasted 13. evoke 14. Marangoni 15. propelling 16. revolutionize 17. settlement
18. tensions 19. insights 20. fragment

Matching sentence: 1. Advancements 2. Geological 3. Abundant 4. Investigations 5. Claims 6. Fluorescent
7. Deceptively 8. Meteorite 9. Enhance 10. Spectacle

CATEGORY

1. Sci/Tech - LEVEL3

Date Created

2024/11/26

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